What is claimed is:

1. A method for reducing noise in a video distribution system comprising:

applying motion compensated temporal filtering to compressed image data using motion vectors previously generated during compression of the image data,

wherein:

said filtering is adapted to reduce noise in said compressed image data,

the need for regeneration of said motion vectors during said filtering step is eliminated, and

adaptive spatial filtering is applied to compressed image data.

2. A motion compensated temporal filtering method for pre-compressed video image data, comprising at least three successive video frames to reduce the presence of noise in said data, including a current frame, a first anchor frame that precedes said current frame, and a second anchor frame that follows said current frame, wherein each of said frames has a plurality of pixels, each of said pixels has an associated amplitude, and a current pixel of said current frame is intermediate and matched to a first pixel in said first anchor frame and to a second pixel in said second anchor frame, comprising the steps of:

for P-frame and B-frame encoding,

a forward prediction stage comprising:

determining an absolute value difference between the amplitude of a pixel located in said current frame and the amplitude of a pixel located in said first frame, the first frame pixel location being offset from the current frame pixel location by a previously calculated motion vector;

determining a filter coefficient, ß(forward) from said absolute value difference,

calculating a proportional value for the previous anchor frame pixel and the current frame pixel, to assign to a calculated current frame pixel value by applying an arithmetic manipulation of their respective amplitude values along with numerical values of ß(forward), (1- ß(forward)), and motion vectors associated therewith,

summing the resulting proportional value of the respective anchor frame pixels with the proportional value of the current frame pixel to obtain a single calculated pixel amplitude value;

additionally for B-frame encoding:

a backward prediction stage comprising:

receiving from the first forward prediction stage temporally filtered, current frame pixel amplitude values,

determining an absolute value difference between the amplitude of a pixel located in said current frame and the amplitude of a pixel located in said second frame, the second frame pixel location being offset from the current frame pixel location by a previously calculated motion vector,

determining a filter coefficient, ß(backward), corresponding to said absolute value difference,

calculating a proportional value for the following anchor frame pixel value and the current frame pixel value to assign to the calculated current frame pixel value, by applying an arithmetic manipulation of their respective amplitude values along with the numerical values of ß(backward), (1-ß(backward)), and the amplitude of said pixel located within said second frame offset by the representative motion vectors, and

summing the resulting proportional value of the respective anchor frame pixels with the proportional value of the current frame pixel to obtain a single calculated pixel amplitude value.

3. The method of claim 1 further comprising a lookup table for determining values for ß(backward) and ß(forward), corresponding to values between 0 and 1, based on a difference of pixel amplitudes.

4. The method of claim 1 further comprising a pipeline architecture whereby motion compensated temporal filtering is combined with spatial filtering and delay elements, to provide a look-ahead scheme for a statistical multiplexer rate control system.

5. The method of claim 1 further comprising selection of one of either transcoding or first-pass encoding for calculating said motion vectors.

6. An adaptive spatial filtering method comprising an arithmetic manipulation of input and output pixel values within a current frame, a weighted mean value for a group of pixels on said frame, and a filter coefficient, α.

7. The method of claim 6 wherein said weighted mean value is determined from a table comprising pixel amplitude values of a number of specified pixels within a predetermined region.

8. The method of claim 7 wherein said pixel amplitude values comprising said predetermined region are inversely proportional to the distance of the pixel from a central pixel within said region.

9. The method of claim 1 comprising a scene change detection process for determining whether said current frame qualifies as a scene change frame.

10. The method of claim 9 wherein said process selects one of either said first stage temporal filter output or said adaptive spatial filter output.

11. Apparatus for reducing noise in a video distribution system, comprising:

a motion compensated temporal filter adapted to filter compressed image data using motion vectors previously generated during compression of the image data, wherein:

said filtering is adapted to reduce noise in said compressed image data,

the need for regeneration of said motion vectors during said filtering step is eliminated, and

adaptive spatial filtering is applied to the compressed image data.

12. A motion compensated temporal filtering apparatus for pre-compressed video image data comprising at least three successive video frames to reduce the presence of

noise in said data, including a current frame, a first anchor frame that precedes said current frame, and a second anchor frame that follows said current frame, wherein each of said frames has a plurality of pixels, each of said pixels has an associated amplitude, and a current pixel of said current frame is intermediate and matched to a first pixel in said first anchor frame and to a second pixel in said second anchor frame, comprising:

for P-frame and B-frame encoding:

a first stage comprising:

a subtracter for determining an absolute value difference between the amplitude of a pixel located in said current frame and the amplitude of a pixel located in said first frame, the first frame pixel location being offset from the current frame pixel location by a previously calculated motion vector;

a comparator for comparing absolute value pixel differences with a table of ß(forward) values stored in a tabular format,

a calculator for determining proportional values for the previous anchor frame pixel and the current frame pixel to assign to a calculated current frame pixel value by applying an arithmetic manipulation of their respective amplitude values along with the numerical values of ß(forward), (1- ß(forward)), and the motion vectors associated with the previous anchor frame,

a calculator for summing the resulting proportional value of the applicable anchor frame pixels with the proportional value of the current frame pixel to obtain a single calculated pixel amplitude value; and

a storage element for storing encoded frames whereby pixels between frames can be compared; and

additionally for B-frame encoding:

a second stage comprising:

a subtracter for determining an absolute value difference between the amplitude of said current pixel and the amplitude of said second pixel, said second pixel location being specified by a location and an offset described by a previously calculated motion vector;

a table of filter coefficient values, ß(backward), associated with said absolute value difference,

a calculator for determining proportional values for the second anchor frame pixel values to assign to calculated current frame pixel values by applying an arithmetic manipulation of their respective amplitude values along with the numerical values of ß(backward), 1- ß(backward), and the motion vectors associated with the second anchor frame;

a calculator for summing the resulting proportional value of the applicable anchor frame pixels with the proportional value of the current frame pixel to obtain a single calculated pixel amplitude value; and

a storage element for storing encoded frames whereby pixels between frames can be compared.